



FACULTY OF SCIENCE

DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL MANAGEMENT & ENERGY STUDIES

MODULE: GR1BFET
Geography for Education 2B

CAMPUS: APK

EXAM: SSA EXAM 2015

DATE: 4 DECEMBER 2015

SESSION: 08:00 – 11:00

ASSESSOR:

MRS D. GREENBERG

MODERATORS:

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DURATION: 3 HOURS

MARKS: 150

PAGES INCLUDING COVER: 12

Please read the following instructions carefully:

1. Answer ALL questions
2. This paper consists of EIGHT sections.
3. Number your sections and answers carefully and neatly
4. This exam paper may not be removed from the exam venue

SECTION A - EARTH'S MODERN ATMOSPHERE

1. MULTIPLE CHOICE QUESTIONS (Write the letter representing the appropriate answer next to the question number in your exam book)

- 1.1) Which atmospheric zone supports the biosphere and is the region of principle weather activity?
- A) thermosphere
 - B) mesosphere
 - C) stratosphere
 - D) troposphere
- 1.2) Which of the following is true of gases in the heterosphere?
- A) The hydrogen, helium, oxygen and nitrogen are well mixed.
 - B) The hydrogen and helium occur at the top of the heterosphere, and the nitrogen and oxygen at the bottom.
 - C) The nitrogen and oxygen occur at the top of the heterosphere and the hydrogen and helium at the bottom.
 - D) Nitrogen occurs at the top, followed—in descending order—by helium, oxygen and hydrogen.
- 1.3) Which of the following is true of the ionosphere?
- A) It primarily absorbs harmful infrared wavelengths.
 - B) All radio signals pass through this region virtually unaffected.
 - C) The region principally absorbs gamma rays, X-rays, and interacts with the solar wind.
 - D) It is being depleted through interactions with human-produced chlorofluorocarbons.
- 1.4) Which of the following is true regarding the depletion of ozone in the ozonosphere?
- A) The depletion is restricted to the arctic and antarctic regions.
 - B) It results from chemical reactions with chlorine derived from CFCs.
 - C) It results from the burning of fossil fuels.
 - D) The notion that ozone is being depleted as a result of human activity has little scientific evidence to support it.
- 1.5) The three stable (i.e., nonvariable) gases in the atmosphere, in order of abundance from most to least, are
- A) carbon dioxide, argon, oxygen.
 - B) oxygen, carbon dioxide, argon.
 - C) nitrogen, oxygen, argon.
 - D) oxygen, argon, nitrogen.
- 1.6) Oxygen (O₂) is
- A) a gas which principally originates from volcanic sources.
 - B) a by-product of photosynthesis.
 - C) one of the gases from Earth's earliest atmospheres.
 - D) now measured at 78.084% by volume in the homosphere.
- 1.7) Noctilucent clouds are associated with the ____ whereas the auroras are associated with the ____.
- A) stratosphere; ozonosphere
 - B) thermosphere; ionosphere
 - C) troposphere; homosphere
 - D) mesosphere; ionosphere

- 1.8) Which of the following is correct regarding lapse rates in the troposphere?
- A) The term "normal (average) lapse rate" refers to the actual lapse rate in effect at any particular time.
 - B) The environmental lapse rate refers to the actual lapse rate at any particular time and may differ substantially from the normal lapse rate.
 - C) The normal lapse rate is always the same as the dry adiabatic rate (DAR).
 - D) Temperatures generally increase with altitude in the troposphere.
- 1.9) Why are humans and other living things not crushed by the pressure of the atmosphere?
- A) Atmospheric pressure increases with altitude and is, therefore, lowest near the Earth's surface.
 - B) While the atmosphere exerts pressure, it is a negligible amount.
 - C) Humans and other living things exert pressure outward, counterbalancing atmospheric pressure.
 - D) The tropopause serves as a buffer against the pressure exerted by the atmosphere.
- 1.10) The high temperatures in the thermosphere occur because
- A) infrared radiation from the ground heats this layer more than any other layer.
 - B) methane is such an effective greenhouse gas.
 - C) carbon dioxide has accumulated to very high levels in this layer.
 - D) it is in direct contact with high energy solar radiation.
 - E) high intensity solar radiation causes strong chemical reactions with ozone, and this heats the layer to very high temperatures.

(10)

2. TRUE OR FALSE QUESTIONS (Write the appropriate answer next to the question number in your exam book)

- 2.1) Atmospheric pressure decreases with altitude.
TRUE FALSE
- 2.2) The amount of CO₂ in the atmosphere is higher now than any time in the last 800,000 years.
TRUE FALSE
- 2.3) Pollution generated in one country can cause problems in other countries.
TRUE FALSE
- 2.4) Air pollution can easily cross national boundaries.
TRUE FALSE
- 2.5) Anthropogenic air pollution is limited to urban areas.
TRUE FALSE

(5)

3. ANSWER THE FOLLOWING:

3.1) Describe characteristics of the Stratosphere specifically, review the function and status of the ozonosphere, or ozone layer.

(5)**[20]**

SECTION B - ATMOSPHERE AND SURFACE ENERGY BALANCES**1. MULTIPLE CHOICE QUESTIONS**

1.1) Which two gases are primarily responsible for the greenhouse effect because of their ability to absorb infrared energy?

- A) oxygen and hydrogen
- B) ozone and dust
- C) nitrogen and oxygen
- D) water vapour and carbon dioxide

1.2) Scattering caused by atmospheric particles larger than the wavelengths of light is

- A) mie scattering.
- B) refraction.
- C) Rayleigh scattering.
- D) transmission.

1.3) Refraction results in changes in both _____ and _____ of light.

- A) colour and reflection
- B) conduction and convection
- C) Rayleigh scattering and mie scattering
- D) albedo and absorption
- E) speed and direction

1.4) On a cloudy day, Earth's surface receives

- A) direct insolation.
- B) diffuse radiation.
- C) direct radiation.
- D) a reduced daylength.

1.5) if the surface of Earth were to suddenly turn white, the temperature of the planet would _____ because _____ insolation would be absorbed.

- A) Decrease; less
- B) Decrease; more
- C) Increase; less
- D) Increase; more

1.6) When water evaporates from a surface, which of the following occurs?

- A) Energy is stored within the water.
- B) Energy is released to the surface.
- C) The surface is warmed.
- D) Heat is transferred back and forth between the air and surface.

(6)

2. TRUE OR FALSE QUESTIONS

2.1) The greater the albedo of a surface, the less it is heated by insolation.

TRUE FALSE

2.2) Heat energy flows from objects that are warmer to those that are cooler.

TRUE FALSE

2.3) The principle of Rayleigh scatter states that atmospheric particles larger than the wavelength of light account for the differential scattering of shorter wavelengths of light.

TRUE FALSE

2.4) The rougher a surface, the higher its albedo.

TRUE FALSE

2.5) Low, thick stratus clouds have little effect on the Earth's climate.

TRUE FALSE

2.6) As water changes states from liquid to vapour, energy is absorbed.

TRUE FALSE

(6)

3. ANSWER THE FOLLOWING

3.1) Albedo is the percentage of insolation that is reflected. Arrange the following from highest albedo to lowest albedo: Grass; Fresh Snow; and Tar Road

(3)

[15]

SECTION C - WATER AND ATMOSPHERIC MOISTURE**1. MULTIPLE CHOICE QUESTIONS**

1.1) The movement of water throughout the atmosphere, hydrosphere, lithosphere, and biosphere is known as the

- A) biogeochemical cycle.
- B) hydroflux.
- C) capillary movement.
- D) hydrologic cycle.

1.2) What is the heat energy involved in the change of state, or phase, in water?

- A) mechanical heat
- B) sensible heat
- C) fusion heat
- D) latent heat

1.3) When water freezes, its volume

- A) increases.
- B) decreases.
- C) remains the same as in the liquid state.

- 1.4) Relative humidity is
- A) the amount of water vapour in the air compared to the normal amount.
 - B) the amount of moisture in the air relative to your own sensible feelings.
 - C) the amount of water vapour in the air relative to the water vapour capacity of the air.
 - D) a basically unused concept when it comes to weather topics.
- 1.5) As temperature increases, the amount of energy available for evaporation
- A) increases.
 - B) decreases.
 - C) remains constant.
- 1.6) An air parcel is considered unstable when it
- A) either remains as it is, or changes its initial position.
 - B) continues to rise until it reaches an altitude at which the surrounding air has a similar temperature.
 - C) it resists displacement upward.
 - D) it ceases to ascend.

(6)

2. TRUE OR FALSE QUESTIONS

- 2.1) Below a temperature of 4°C, water expands as it continues to cool.

TRUE FALSE

- 2.2) Evaporation is a cooling process.

TRUE FALSE

- 2.3) Air is saturated when the dew-point temperature and the air temperature coincide.

TRUE FALSE

- 2.4) Relative humidity is the mass of water vapour per mass of air.

TRUE FALSE

- 2.5) Warm air is capable of holding more water vapour than cooler air.

TRUE FALSE

- 2.6) An unstable air parcel continues to rise until it reaches an altitude where the surrounding air has a density and temperature similar to its own.

TRUE FALSE

(6)

3. ANSWER THE FOLLOWING

- 3.1) Explain the cloud formation and condensation processes.

(8)**[20]**

SECTION D - THE DYNAMIC PLANET**1. MULTIPLE CHOICE QUESTIONS**

- 1.1) What type of rock forms from the solidification of molten material?
A) sedimentary
B) metamorphic
C) igneous
- 1.2) Which rock type makes up approximately 90% of the Earth's crust.
A) sedimentary
B) metamorphic
C) igneous
- 1.3) What type of rock is derived from the bits and pieces of former rocks?
A) sedimentary
B) metamorphic
C) igneous
D) hydrothermal
- 1.4) A rock transformed from any other rock through extreme heat and or pressure is referred to as
A) sedimentary.
B) metamorphic.
C) igneous.
D) ancient.
- 1.5) The process whereby one portion of the lithosphere beneath another and dives downward into the mantle is called
A) rifting.
B) subduction.
C) compression.
D) isostatic uplift.

(5)**2. ANSWER THE FOLLOWING**

- 2.1) Depict Earth's interior in cross section, and describe each distinct layer.

(15)**[20]**

SECTION E - TECTONICS, EARTHQUAKES, AND VOLCANISM**1. MULTIPLE CHOICE QUESTIONS**

1.1) Which of the following is incorrectly matched?

- A) tension — normal fault
- B) compression — shortening or folding
- C) tension — stretching or faulting
- D) shearing — stretching or faulting

1.2) Fault types are defined by

- A) the tilt and orientation of the fault plane.
- B) the amount of movement along the fault plane.
- C) the amount of energy liberated during movement.
- D) the type of rock material in which they occur.

1.3) If one were to stack thick fabric on top of one another, then push the opposite ends towards one another, resulting in bending and rumpling, this would illustrate what physical process?

- A) faulting
- B) folding
- C) shear
- D) tension

1.4) An earthquake is best described as

- A) the point within the Earth where seismic waves originate.
- B) the sharp release of energy in the Earth's crust that creates seismic waves.
- C) the amount of ground displacement along a fault.
- D) the amount of stress rocks along plate boundaries experience.

1.5) Volcanic activity located away from plate boundaries is associated with

- A) subduction and melting of plates along collision zones.
- B) hot spots.
- C) rift zones.
- D) all of the above.

(5)

2. TRUE OR FALSE QUESTIONS

2.1) Geologically speaking, the continents began forming relatively recently.

TRUE FALSE

2.2) Shortening or folding of the crust is produced by strain caused by tension.

TRUE FALSE

2.3) Amplitude is the height of a seismic wave and is directly related to the amount of ground movement.

TRUE FALSE

2.4) Scientists have been able to accurately forecast earthquakes for approximately a decade.

TRUE FALSE

2.5) Human populations are growing in areas prone to seismic activity and near active volcanoes.

TRUE FALSE

(5)

3. ANSWER THE FOLLOWING

- 3.1) Explain how Interplate and Intraplate Earthquakes occur (4)
- 3.2) Describe the three orders of relief and give one example of each. (6)
- [20]

SECTION F - WATER RESOURCES**1. MULTIPLE CHOICE QUESTIONS**

- 1.1) Outgassing refers to
- A) changes in the total amount of water on Earth through evapotranspiration.
 - B) a steady-state equilibrium in the water system caused by cycles of evaporation and condensation.
 - C) the dynamic equilibrium between surface and ocean water.
 - D) process in which water and water vapour emerge from deep layers within and below the Earth's crust.
- 1.2) The largest portion of fresh water today is located in
- A) clouds.
 - B) groundwater resources.
 - C) ice caps and glaciers.
 - D) the major rivers and lakes of the world.
- 1.3) The hydrologic cycle
- A) involves the continuous movement of water in all its states throughout the lower atmosphere, biosphere, lithosphere, and hydrosphere.
 - B) is limited to freshwater circulation in the hydrosphere.
 - C) refers to the highly localized transfer of water from plants and soils to the atmosphere and back.
 - D) is the groundwater component of the global water cycle.
- 1.4) Soil moisture tightly bound to each soil particle and unavailable for plant use is termed _____ water.
- A) capillary
 - B) gravitational
 - C) available
 - D) hygroscopic
- 1.5) The line of contact between the zone of aeration and the zone of saturation is known as the
- A) water table.
 - B) saturation contact.
 - C) influent line.
 - D) aquiclude.
- 1.6) Which of the following is a potential source of groundwater pollution?
- A) septic tanks
 - B) pesticides and fertilizers
 - C) dumps
 - D) septic tanks, pesticides and fertilizers, and dumps

(6)

2. TRUE OR FALSE QUESTIONS

2.1) Water is a renewable resource, constantly cycling through the environment in the hydrologic cycle.
TRUE FALSE

2.2) Human made lakes are generally called reservoirs.
TRUE FALSE

2.3) groundwater pollution that our generation creates will persist far into the future (decades to centuries) because it is virtually impossible to clean an aquifer once it is polluted.
TRUE FALSE

2.4) Groundwater represents the largest potential freshwater source on Earth.
TRUE FALSE

2.5) Desalination removes organic compounds, debris, and salinity from seawater and represents a method to provide potable water for domestic use.
TRUE FALSE

2.6) Water quantity and quality are pressing issues for water resource managers.
TRUE FALSE

(6)

3. DEFINE THE FOLLOWING TERMS:

3.1) Evaporation (1)

3.2) Transpiration (1)

3.3) Interception (1)

3.4) Infiltration (1)

3.5) Percolation (2)

3.6) Soil moisture zone (2)

3.7) Wetland and describe why these areas are important (5)

[20]

SECTION G –POPULATION: WORLD PATTERNS, REGIONAL TRENDS**1. MULTIPLE CHOICE**

- 1.1) The systematic study of human population is called
A) ecology.
B) ekistics.
C) geography.
D) demography.
- 1.2) Zero population growth (ZPG)
A) is achieved when births and deaths are equal.
B) always results in an increasingly elderly population.
C) assures the lowest total costs of social programs.
D) results when immigration matches emigration.
- 1.3) When the average fertility rate of a population drops to the replacement level,
A) population numbers stabilize and growth ceases.
B) deaths begin to outnumber births.
C) the average age of the population steadily increases.
D) population continues to grow for a generation or more.
- 1.4) The Malthusian theory is based on which of the following assumptions?
A) As urbanization occurs, the rate of population growth decreases.
B) Population tends to increase more rapidly than do the food supplies to support that population.
C) Growth in productive capacity generally exceeds population increases.
D) Food production increases geometrically, while population grows arithmetically.
- 1.5) Rapid increases in life expectancy are characteristic of which stage of the demographic transition?
A) first
B) second
C) third
D) fourth

(5)**2. TRUE OR FALSE QUESTIONS**

- 2.1) The physiological density generally results in the highest density measure when compared to the crude density and the agricultural density measures.

TRUE
FALSE

- 2.2) Since many societies have a predominantly young age structure, their populations will tend to increase over the short run despite successful national family planning programs.

TRUE FALSE

- 2.3) The distribution of world population is the result of spatial variation in agricultural potential and development.

TRUE FALSE

- 2.4) Population projections are never wrong.

TRUE FALSE

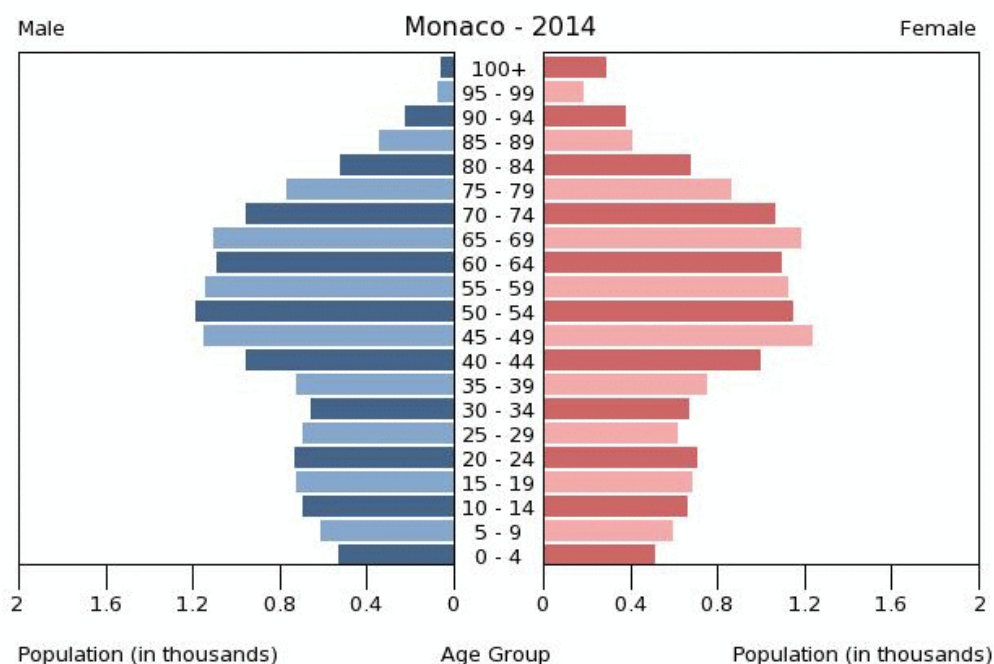
- 2.5) There is invariably a close correlation between population density and levels of living.

TRUE FALSE

(5)

3. ANSWER THE FOLLOWING QUESTION

3.1) Discuss the country depicted in the Population Pyramid below, and predict what advantages or disadvantages the country will face in the next 20 years



(10)

[20]

SECTION H - HIV/ AIDS

1. ANSWER THE FOLLOWING QUESTIONS

1.1) What are the four main reasons for people developing AIDS today?

(5)

1.2) How has this affected the everyday lives of South Africans?

(10)

[15]

TOTAL [150]